1. A demultiplexer comprising:

a) an optical splitter including an input that receives an optical data signal having a plurality of data channels, the optical splitter generating a plurality of substantially identical optical data signals at a plurality of outputs;

b) an electrical clock recovery circuit including an input that receives the optical data signal, the electrical clock recovery circuit generating an electrical clock signal at an output, the electrical clock signal being substantially synchronized to the optical data signal and having a frequency that is an integer multiple of a bit rate of one of the plurality of data channels;

c) a plurality of phase shifters, each of the plurality of phase shifters including a clock input that receives the electrical clock signal and including a control input, a respective one of the plurality of phase shifters generating a phase-shifted electrical clock signal in response to a signal applied to the control input of the respective one of the plurality of phase shifters; and

d) a plurality of sampling circuits, each of the plurality of sampling circuits including a data input that receives one of the plurality of substantially identical optical data signals, and including a clock input that receives one of the phase-shifted electrical clock signals, each of the plurality of sampling circuits generating an electrical signal representing one of the plurality of data channels of the optical data signal at an output.

2. The demultiplexer of claim 1 wherein the optical data signal comprises a bit interleaved optical time-division multiplexed optical signal.

3. The demultiplexer of claim 1 wherein the optical data signal comprises a polarization multiplexed optical signal.

4. The demultiplexer of claim 3 further comprising a polarization beamsplitter having an input that receives the polarization multiplexed optical signal, the polarization beam splitter splitting the polarization multiplexed optical signal into at least two optical signals having different polarization states.

5. The demultiplexer of claim 1 wherein the optical data signal comprises a bit interleaved optical time-division multiplexed polarization multiplexed optical signal.

6. The demultiplexer of claim 1 wherein the optical data signal comprises a packet interleaved optical time-division multiplexed optical signal.

7. The demultiplexer of claim 1 wherein the control input of the respective one of the plurality of phase shifters is electrically coupled to the output of a respective one of the plurality of sampling circuits, the respective one of the plurality of phase shifters generating a phase-shifted electrical clock signal in response to the electrical signal representing one of the plurality of data channels of the optical data signal.

8. The demultiplexer of claim 1 wherein the electrical clock recovery circuit comprises:

a) a photodetector that receives the optical data signal and generates an electrical data signal that is related to the optical data signal; and

b) a phase-locked loop that synchronizes a frequency and a phase of a local oscillator onto a frequency and a phase of the electrical data signal generated by the photodetector.

9. The demultiplexer of claim 8 wherein the phase-locked loop comprises a narrow-band amplifier that amplifies the electrical data signal generated by the photodetector.

10. The demultiplexer of claim 1 further comprising a processor that has an output that is electrically coupled to the control input of one of the plurality of phase

shifters.

11. The demultiplexer of claim 1 wherein at least one of the plurality of sampling circuits comprises a photodetector that receives the plurality of substantially identical optical data signals and generates an electrical data signal that is related to the optical data signal having the plurality of data channels.

12. The demultiplexer of claim 1 wherein at least one of the plurality of sampling circuits comprises an electro-absorption modulator.

13. The demultiplexer of claim 1 further comprising at least one demultiplexer circuit having an input that is electrically coupled to the output of at least one of the plurality of sampling circuits.

14. A method of demultiplexing, the method comprising:

a) generating a plurality of substantially identical optical data signals from an optical data signal having a plurality of data channels;

b) generating an electrical clock signal from the optical data signal having the plurality of data channels, the electrical clock signal being substantially synchronized to the optical data signal and having a frequency that is an integer multiple of a bit rate of one of the plurality of data channels of the optical data signal;

c) generating a plurality of phase-shifted electrical clock signals in response to at least one control signal, a respective one of the plurality of phase-shifted electrical clock signals being synchronized to a respective one of the plurality of data channels; and

d) sampling a portion of each of the plurality of substantially identical optical data signals thereby generating a plurality of sampled optical data signals, a respective one of the plurality of sampled optical data signals being synchronized to a respective one of the plurality of data channels.

15. The method of claim 14 wherein a phase shift of one of the plurality of phase shifted electrical clock signals is substantially zero.

16. The method of claim 14 wherein the optical data signal comprises a bit interleaved optical time-division multiplexed optical signal.

17. The method of claim 14 wherein the optical data signal comprises a polarization multiplexed optical signal.

18. The method of claim 14 wherein the optical data signal comprises a packet interleaved optical time-division multiplexed optical signal.

19. The method of claim 14 wherein the electrical clock signal comprises a periodic waveform having a frequency that is harmonically related to the bit rate of one of the plurality of data channels.

20. The method of claim 14 wherein the at least one control signal is related to at least one of the plurality of data channels.

21. The method of claim 14 wherein the at least one control signal is generated from one of the plurality of sampled optical data signals.

22. The method of claim 14 wherein the sampling the portion of each of the plurality of substantially identical optical data signals reduces intersymbol interference in at least one of the a plurality of sampled optical data signals.

23. The method of claim 14 further comprising demultiplexing each of the plurality of sampled optical data signals to generate a plurality of demultiplexed optical data signals.

24. A demultiplexer for polarization multiplexed optical signals comprising:

a) a polarization beamsplitter including an input that receives a polarization multiplexed optical signal having a plurality of data channels, the polarization beamsplitter generating at least two optical data signals

having different polarization states at a plurality of outputs;

b) an electrical clock recovery circuit including an input that receives the polarization multiplexed optical signal, the electrical clock recovery circuit generating an electrical clock signal at an output, the electrical clock signal being substantially synchronized to the polarization multiplexed optical signal and having a frequency that is an integer multiple of a bit rate of one of the plurality of data channels;

c) a plurality of phase shifters, each of the plurality of phase shifters including a clock input that receives the electrical clock signal and including a control input, a respective one of the plurality of phase shifters generating a phase-shifted electrical clock signal in response to a signal applied to the control input of the respective one of the plurality of phase shifters; and

d) a plurality of sampling circuits, each of the plurality of sampling circuits including a data input that receives one of the at least two optical data signals, and including a clock input that receives one of the phase-shifted electrical clock signals, each of the plurality of sampling circuits generating an electrical signal representing one of the plurality of data channels of the polarization multiplexed optical signal at an output.

25. The demultiplexer of claim 24 wherein the polarization multiplexed optical signal comprises a bit interleaved optical time-division multiplexed polarization multiplexed optical signal.

26. The demultiplexer of claim 24 wherein the polarization multiplexed optical signal comprises a packet interleaved optical time-division multiplexed polarization multiplexed optical signal.

27. The demultiplexer of claim 24 wherein the control input of the respective one of the plurality of phase shifters is electrically coupled to the output of a respective one of the plurality of sampling circuits, the respective one of the plurality of

phase shifters generating a phase-shifted electrical clock signal in response to the electrical signal representing one of the plurality of data channels of the polarization multiplexed optical signal.

28. The demultiplexer of claim 24 wherein at least one of the plurality of sampling circuits comprises a photodetector that receives the one of the at least two optical data signals and generates an electrical data signal that is related to the polarization multiplexed optical signal having the plurality of data channels.

29. The demultiplexer of claim 24 further comprising at least one demultiplexer circuit having an input that is electrically coupled to the output of at least one of the plurality of sampling circuits.

30. The demultiplexer of claim 24 wherein the input of the electrical clock recovery circuit receives one of the at least two optical data signals to generate the electrical clock signal at the output.

31. A method of demultiplexing polarization multiplexed optical signals, the method comprising:

a) generating at least two optical data signals having different polarization states from a polarization multiplexed optical signal having a plurality of data channels;

b) generating an electrical clock signal from the polarization multiplexed optical signal, the electrical clock signal being substantially synchronized to the polarization multiplexed optical signal and having a frequency that is an integer multiple of a bit rate of one of the plurality of data channels;

c) generating a plurality of phase-shifted electrical clock signals in response to at least one control signal, a respective one of the plurality of phase-shifted electrical clock signals being synchronized to a respective one of the plurality of data channels; and

d) sampling a portion of each of the at least two optical data signals thereby

generating at least two sampled optical data signals, a respective one of the at least two sampled optical data signals being synchronized to a respective one of the plurality of data channels.

32. The method of claim 31 wherein a phase shift of one of the plurality of phase shifted electrical clock signals is substantially zero.

33. The method of claim 31 wherein the polarization multiplexed optical signal comprises a bit interleaved optical time-division multiplexed polarization multiplexed optical signal.

34. The method of claim 31 wherein the polarization multiplexed optical signal comprises a packet interleaved optical time-division multiplexed polarization multiplexed optical signal.

35. The method of claim 31 wherein the at least one control signal is generated by the sampling one of the at least two optical data signals.

36. The method of claim 31 wherein the sampling the portion of each of the at least two optical data signals reduces intersymbol interference in at least one of the at least two sampled optical data signals.

37. The method of claim 31 further comprising demultiplexing each of the at least two sampled optical data signals to generate a plurality of demultiplexed optical data signals.

38. The method of claim 31 wherein the electrical clock signal is generated by one of the at least two optical data signals.